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A CLINICAL LECTURE ON FEEDING IN GASTRIC ULCER.

DELIVERED AT ST. BARTHOLOMEW'S HOSPITAL

By SIR LAUDER BRUNTON, M.D., F.R.S.

Physician to the Hospital.

GENTLEMEN,—I have lectured to you before on the subject of gastric ulcer, and I told you that the usual plan we follow when cases of this disease come into the hospital wards is to put them upon rectal feeding for some days—from two to five days—according to the severity of the case; and then to begin gradually to feed them with small quantities by the mouth. Under this treatment they generally recover pretty quickly, so that we are able to get them out of the hospital cured in about six weeks. There is another case at present, however, in Mr. Cripps's wards, which came in with the symptoms of perforation, and was operated upon. The ulcer was found with a good deal of difficulty. The abdomen was washed out, the ulcer stitched up, and the girl is now doing exceedingly well. One of the cases in Elizabeth Ward has, on the contrary, progressed very slowly. Up to a certain point she began to recover well on the ordinary treatment, so far, indeed, that I signed the paper for her to go to the convalescent home at Swanley. But on the day on which she was to have started she had a relapse, the pain in the epigastrium returned, and we have been obliged to keep her on a very limited diet ever since. In some cases of gastric ulcer the relapse is apt to come on because one puts the patients on too free a diet, and the other day Mr. Cripps asked me to go into his ward, and give some advice as to the kind of diet upon which the patient upon whom he had operated should be put. This made me think that very likely some of you might like to hear more in detail

not only about the kind of diet one gives to cases of convalescent gastric ulcer, but also about the reason why we give certain articles of food to them.

Perhaps the easiest way to put it is this: Supposing you have an ulcer on the back of your hand, how are you going to treat it? You know perfectly well you would not like it sand-papered three or four times a day, nor would you like to have it dressed with vinegar instead of with water. You would not like to have a poultice made of pickles, pepper, and cayenne applied to it. You must treat a gastric ulcer in very much the same way; you must avoid irritating the ulcer by anything that will do harm to it, either mechanically or chemically. Some things injure mechanically, others chemically; some do both. Now, amongst the things that injure mechanically are hard, indigestible things that will play the part of sandpaper. If you take a pot of strawberry jam, treat it with water, allow the mixture to rest upon a sieve, so that all the soluble parts shall pass through, and then take the residue, you will find something lying upon the sieve which, if rubbed upon an ulcer on the hand, would have very much the same effect as sandpaper. The small achenia, or seeds as they are usually called, of the strawberry are absolutely indigestible; they are very hard, and pointed at one end. We know that they are indigestible, because the seeds of strawberries have been found in the faecal masses which have come down to us from prehistoric man, so we know prehistoric man was in the habit of feeding on strawberries, and that he was powerless to digest the seeds. And, in fact, it is the indigestibility of seeds which gives permanency to the races of plants. If the seeds were digestible, they would be destroyed in the intestine, when they were swallowed. But as these seeds are very often enveloped in a coating, or are placed upon some sweet and attractive substance, they are eaten along with the soft sweet substance. And then the seeds themselves, passing thus into the digestive tract of animals or birds, are carried to a distance, and the plant from which they come is propagated. It is in this way that the seeds of trees and plants are carried from one oceanic island to another by birds, sometimes for hundreds of miles. The bird

itself eats the fruit, carries the seeds of the fruit with it, and then deposits the undigested seeds in some new island, where they spring up and grow. So seeds may be looked upon as absolutely indigestible. And even the kernels or ovules of seeds are usually very hard, such as almonds, nuts, and the like, and these are to be avoided, even though they are not so hard or so irritating as the whole seeds or fruits. Thus nuts are less irritating than the achenia or seeds of the strawberry or raspberry. First of all, then, you have to avoid anything that is irritating in the way of seeds or stones in fruits.

Then another thing which is indigestible and very irritating mechanically is a bone. You are not likely to eat whole bones except in the case of fish, but fish bones may sometimes give rise to great pain and produce great danger. One of the porters here who used to attend the out-patient room was one day, just after we had finished seeing the out-patients, seized with intense pain. He was clearing up the out-patient room when suddenly he became doubled up, and crouched over the table in awful pain. I sent him up to the ward and had him put to bed immediately. The pain passed off. Next day the pain, which on the first day had been chiefly in the right iliac fossa, passed over to the left. There was no apparent reason for this. The next day he got the pain in the rectum. The house-physician put his finger into the rectum, and there found an arrow-headed piece of bone about 2 or 3 inches long which had come from the head of a cod, and this had stuck transversely across the rectum. Even smaller fish bones may do a great deal of harm, and in case of gastric ulcer even the small bones of fish are to be avoided. Still more risky, however, are the little splinters of bone which you sometimes get in curries. You do not, as a rule, get splinters of bones in ordinary food, but you do frequently get them in curries; and sometimes in game pies you may get the same, because the bones of the game have been shattered by shot. They are less likely to be noticed in a curry or pie than if you are eating the whole bird. So avoid all stones and all bones.

Then you must avoid substances that will act as scrubbing brushes. The vegetables which I have before me here consist

partly of soft cellulose and partly of the harder cellulose which forms the stalk of the cabbage. Now, cellulose is quite insoluble in the stomach, and the hard cellulose fibres, if they are rubbed together for a while, so that the softer parts are removed, tend to form something like a felt, which may still be soft; but if the vegetable be at all old this felt may be pretty hard, and may cause a good deal of irritation. So that fibres, wherever they may happen to be, either in vegetables or in fruits, ought to be avoided. In fruits you get them occasionally, but they are not so common. Cellulose in a hard form in fruits occurs more frequently in the form of skins, which are also quite indigestible in the stomach. Therefore skins of fruits should be avoided, and any fruit the pulp of which contains hard fibres should also be rejected. When you cannot remove the skin and you cannot remove the stones, as in the case of raisins and currants, the fruit itself should be rejected. From currants you cannot remove the skins, and so you avoid anything containing currants. I say this specially because I remember a case of ulcer, not in the stomach but in the intestine, where the patient seemed to be killed by a currant just as surely as by a rifle bullet. It was a case occurring in the female ward, that of a woman who was suffering from typhoid fever, who had been getting on perfectly well—as well as any one could wish—until one visiting day, when a friend unfortunately came in, and, compassionating the poor woman's scanty fare as she thought it, gave her a currant bun to eat. The patient ate the currant bun, got increased irritation in the iliac fossa, her temperature went up, and she died. She was simply killed by that currant bun, and in all probability if she had not eaten it she might have been well and alive now. That is a thing, therefore, to which we have to pay special attention.

Strings are also to be found in meat, and it is upon the comparatively less or greater size of the strings of meat that their digestibility or indigestibility depends. Here is some beef and here is some mutton. Break a bit of each up for yourselves and see the comparative thickness of the fibres in the beef and in the mutton. If you notice the fibres in the beef when you tear it up, you will see they are rather big

fibres. The mutton tears into rather smaller ones, and the chicken into quite fine fibres. Now, I said just now that strings might act partly mechanically and partly chemically. The way in which they act chemically is this: Anything which tends to stop up the mouth of the pylorus tends to keep the food longer in the stomach, and the longer it stays there the more acid does it become, either from the greater increase in the hydrochloric acid, or from the decomposition of the food leading to the formation of other acids, such as lactic or butyric. So that anything hard, anything that is likely to plug the pylorus, tends to increase the acidity in the stomach. Now, in cases of gastric ulcer the acidity of the stomach is generally over the normal, and we rather wish to diminish than to increase it.

In cases of gastric ulcer one trusts very much to fluid food, and the fluid food *par excellence* is milk. I do not know if any of you have thought of milk as coming under the heading of stringy food, and yet it sometimes does so.

One of the most extraordinary things I ever saw in my life was a lump of something about $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ broad and $\frac{1}{2}$ thick. It was of a slate-grey colour, and looked like felt, and was also like it in consistence. It looked somewhat like the kind of felt of which shoe soles are made. My colleague, Dr. Wickham Legg, showed it to me. A woman had brought it to him saying that she had vomited the thing up. He was a good deal puzzled. As it happened I had seen something of the same sort before in the case of a patient who had passed a large concretion by the rectum wherein the same fibrous structure was to be found. This concretion was formed as a consequence of drinking a very large draught of milk at once. So I asked the patient whether she had drunk a lot of milk all at once. She told me she had drunk nearly a quart at once; and this large felt-like mass was the result of it. The milk when poured into the stomach had become coagulated; the curds had become partly digested by the stomach and partly worked up into these long fibres of casein which had become felted, and so this big lump had been formed. I have here some artificial gastric juice, and I will pour some into

some milk. You will probably find the coagulation begins at once. But there are not such large flakes as I expected. This gastric juice is only of normal strength, that is to say, 0.2 per cent. If I put milk into lime water you will find a difference. As a rule when you mix cow's milk with the secretion of the stomach it tends to form rather big flakes, whereas if you mix it with a little lime water before, it falls as a much finer precipitate and it does not tend to become worked into the same hard resistant mass as it does if you pour it into the stomach without admixture, either with barley water, lime water, or soda water. These three things tend to prevent the flakes from aggregating and the casein from becoming thick and hard, and so they increase the digestibility of the milk. If milk is peptonized it does not tend to form these large flakes; and so another way of treating your patient is to give peptonized milk.

As I have said, the longer the material stays in the stomach the more acid is it likely to become, and therefore at the beginning of your treatment you do not want to give your patient a large quantity of food at once; you want to get the stomach emptied. Therefore we begin the treatment of gastric ulcer by giving, in addition to the nutrient enemata, only a tablespoonful of milk with a tablespoonful of lime water, say, every two hours, gradually increasing this quantity as we find the patient is able to bear it without it causing pain. If it causes pain we diminish the quantity. We can then, after a few days, increase the proportion of milk, and instead of giving equal parts we may give one part of lime water to four of milk, and then one part of lime water to eight of milk, and so on, always taking care to modify the treatment according to the condition of the patient. When we notice that the patient is not bearing the less diluted milk or the larger quantity at each dose, then we lessen it.

I have just shown you the effect of differences in the fibre of meat. But we must bear in mind that the effect of the gastric juice upon meat varies very much according to the form in which the meat is put into the stomach. If the meat is thoroughly masticated and broken up in the mouth, the

gastric juice has a chance of dissolving it which it has not when the meat is not broken up. I have here some specimens, which I pass round. Here is a piece of meat which has not been masticated at all, and you see that the meat lies in the bottle almost untouched. There has been so little action of the acid upon the surface of it that it is hardly perceptible. Here is a piece of meat which has been masticated in the ordinary way—that is to say, two or three bites given to it; and here you see that, although the lump of meat has been broken up, there has been still comparatively little action of the gastric juice upon it. But here is a piece of meat which has been thoroughly masticated before it was put into the gastric juice in the bottle, and you see there is absolutely no lump at all; it is all converted into fine granular matter. These specimens have all been standing for about four hours at the temperature of a somewhat warm room, and the digestion is still far from complete, but if they had been at the temperature of the body I have very little doubt that the meat that had been thoroughly masticated would have been completely digested ere now, and it would have formed almost a complete solution, whereas the others are scarcely acted upon at all. There are some things which are hardly attacked by gastric juice. Here is a piece of the crackling from roast pork, and you see it has hardly been acted upon at all. The fat has begun to separate from it to some extent, but the outline of the piece of crackling is hardly altered. Here is a hard-boiled egg, and I pour off the liquid from it into another bottle, so that you may see how much has been dissolved and how much has been left undissolved. You see that although a certain amount has been dissolved, there are great masses of the hard-boiled egg still remaining. Here is a piece of hard-boiled egg which has been thoroughly masticated, and I think you will see that almost the whole of it has been converted into a fine emulsion, and there is hardly any residue. Here I have a piece of cheese which has been masticated in the ordinary way, that is to say, two or three bites given to it and then swallowed. You see that the outside of the cheese has been a little eroded, but the masses are there just as they were. Here, on the contrary, is some cheese which

has been thoroughly broken up by mastication, and you see that although it does not form an emulsion, yet all the particles are so fine that they will pass with perfect readiness through a very fine sieve. The reason why cheese is so often spoken of as being very indigestible is because lumps of cheese, when swallowed, do not imbibe the gastric juice readily, as a bit of meat will do. Cheese is hard of texture and is acted upon only on its surface by the gastric juice. The consequence is that it remains in the stomach for hours, and then when the stomach tries to empty itself a hard lump of cheese comes to the pyloric orifice, the sphincter there reacts against the passage of anything through it, just as sphincters elsewhere do, and the bit of cheese is turned back into the stomach again. Along with it the whole of the liquid contents are retained in the stomach, and the churning process goes on again, until the acidity becomes so great that the stomach becomes irritated, and finally vomiting sets in, and the whole of the gastric contents are ejected. People look at the vomited matter and find that everything is digested but the cheese, and then they say, "cheese digests everything but itself."

You see that, as a rule, by careful mastication you can prevent many of these troubles. But, as a rule, we cannot depend upon our patients' teeth sufficiently, nor upon their habits of mastication. So in the hospital, after we have put them upon milk for some days, we pass from it to such things as custards, which are very readily digestible, and the custard is so smooth that it can produce no mechanical injurious influence upon any ulcer, however tender it may be. Then from custard we go on to pounded fish. You see, the pounded fish I have here is so finely broken up that if you put it into gastric juice it will be quickly dissolved, and it will pass out of the stomach almost like milk. Then we give pounded meat, and if it is broken up with fluid it is really like milk. You may make a very nice liquid food of pounded chicken, which is very useful not only in cases of gastric ulcer, but in disease of all kinds when patients will not take meat. You simply take the breast of a chicken, cut it into thin slices, then mince it up, put it into a mortar, grind it with a little chicken broth or else a little

weak beef-tea until it is like a paste. Then mix it up with a little more chicken broth or beef-tea until it is about the consistence of milk. A patient can drink this down just as he would drink milk. And many patients will drink this chicken milk even when they will not swallow the soft paste of pounded chicken, or chicken panada as it is often called, which I show you.

I will now briefly recapitulate. In cases of gastric ulcer you begin by giving the patient rest in bed, with feeding by the rectum for a few days, then careful feeding by the mouth, while you still continue rectal feeding. The first food given is generally milk in small quantity, a tablespoonful of milk with a tablespoonful of lime water every two hours. Gradually diminish the lime water at the same time that you increase the proportion of milk, as the patient will bear it for several days more. Then you may try the effect of custard, which is very mild and non-irritating. Then you may give the patient pounded fish, and perhaps pounded chicken next day. You may give at the same time some chocolate, which I find is very well borne, and makes a great change in the patient's diet, which is otherwise very monotonous and tasteless. Then you will give some of the various foods, of which I have a large supply here, but I must not go into them just now.

Now I want to bring one other little point before you, because nearly all those various foods consist of starch and dextrine in a certain proportion. It is almost worth while to try to make starch in two ways. Take some starch and put it into hot water, and you will see what a mess you will make of it, because it goes all into lumps, and will not make a smooth paste. But beat your starch up with a little cold water, and then you will get it into a paste like thickish cream. Then add boiling water to it, and you will get a fine paste. When you are dealing with starchy foods, you must treat them like starch—that is, make them into a paste with cold water first, and then add hot water afterwards.

Lastly, one word about bread. The digestibility of bread, like that of meat, depends to an enormous extent upon the way in which it can be broken up in the intestine. Here is a

piece of breakfast roll, of very good quality. I take a piece out of the middle and knead it up. It forms a firm putty-like mass, and, if you were to put it into pancreatic juice, you would see how little would be absorbed. Here I have some stale bread, and I crumble it up easily. You see the difference, and you will be able to appreciate the advantage of the latter over the former. The stale bread is broken into a fine powder, but the new bread forms an indigestible lump.

Had time permitted, I wished to have said more on this subject, but I have already exceeded my limits.

